Project No. BA-03

Naomi Freshwater Diversion

- Non-CWPPRA (75% State – 25% Parish)
- Completed February 1993
- Location:

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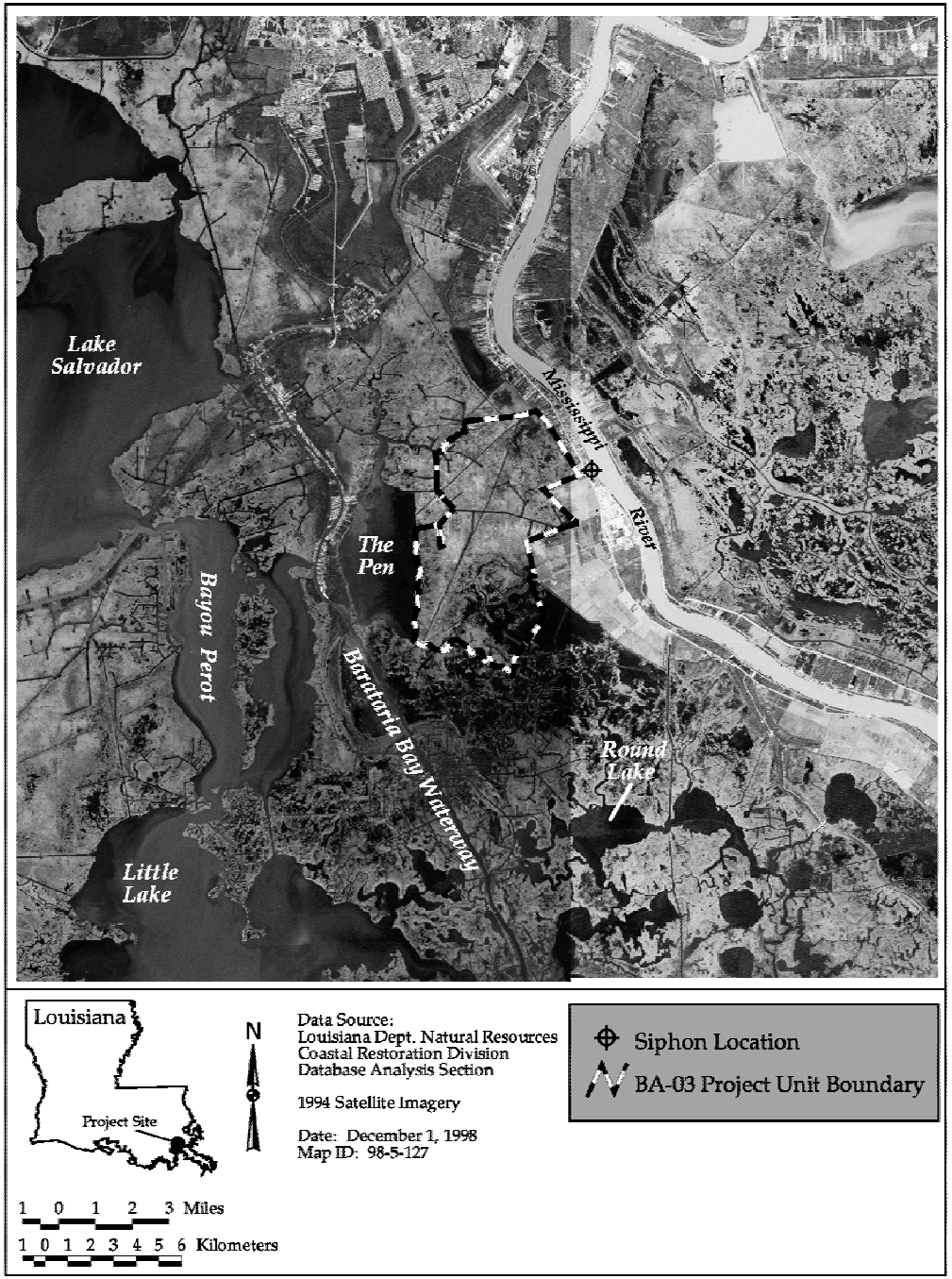
Project Location



Planning- Causes of Wetland Loss

- Natural Causes:
  - Subsidence
  - Sea level rise
- Human Activity:
  - Construction of Miss. River levees – Stopped annual flooding of freshwater/sediments
  - Construction of oil field canals through the natural ridges in the area
    - Increased tidal exchange
    - Allowed saltwater intrusion

Goals

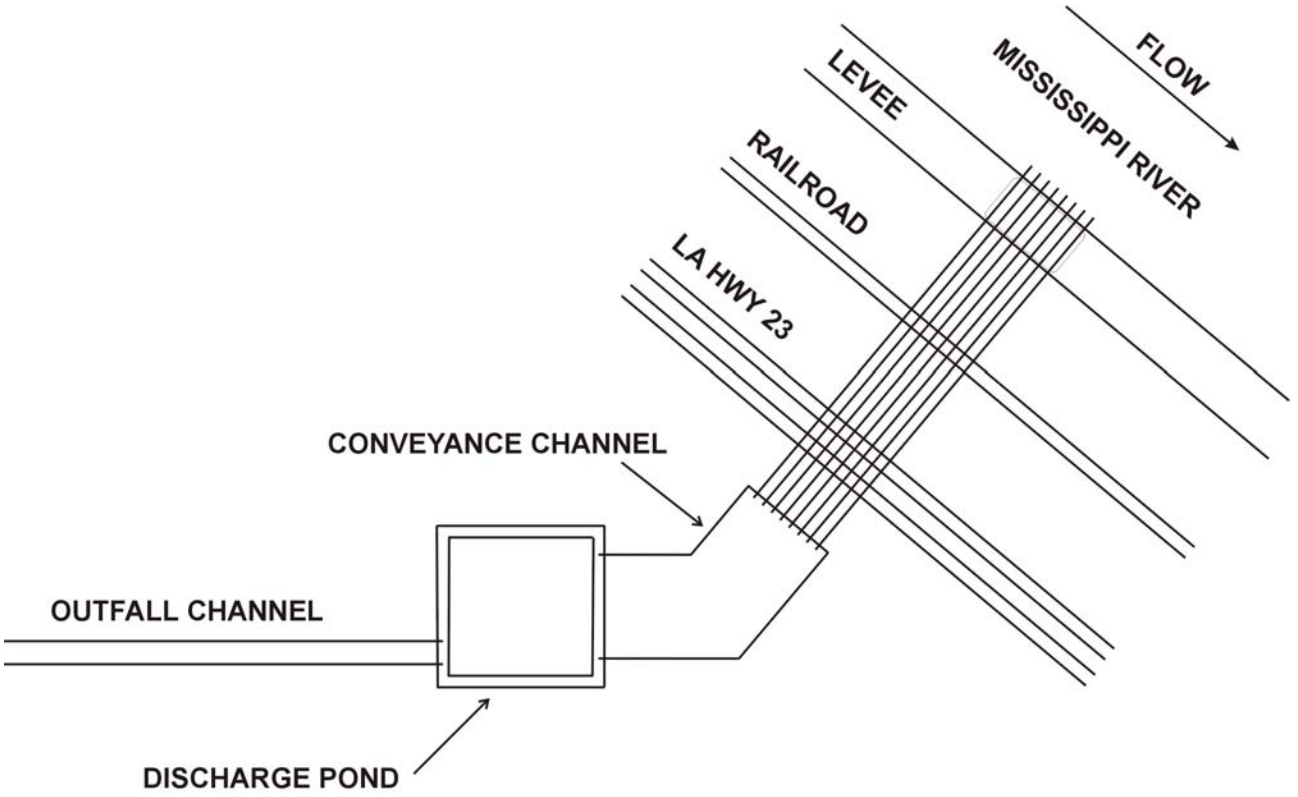
- Reduce and stabilize mean salinity
- Increase marsh to open-water ratio
- Improve growing conditions for, and increase relative abundance of, fresh to intermediate marsh species

Background

- Freshwater diversions replace some of functions once provided by over bank flooding

- Controlled freshwater diversions – Mississippi River
  - Bayou Lamoque (1956)
  - White's Ditch (1963)
  - Violet (1979)
  - Caernarvon (1991)
  - West Pt a La Hache (1992)
  - Naomi (1993)
  - Davis Pond (2002)

Project Layout



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Naomi Siphon

Operations Plan

- Plaquemines Parish is responsible for operations.
- Initial operations were based on operations scheme developed by Brown & Root. This scheme included making seasonal adjustments.
- After maintenance problems reduced the capacity of the siphon, the operations plan was changed to that of continually operating all pipes available for operation with no seasonal adjustments.

Operations

Condition	Average Output (cfs)
Estimated maximum flow (April)	2150 (8 pipes)
Estimated minimum flow (October)	1232 (8 pipes)
Original planned average output	801
Actual when operating (74% of time)	823
Actual (operation + non-operation)	560

Operations: Causes of Reduced Output

- Maintenance was minimal until 2001
  - Leaking valves caused pipes to lose prime
- Oyster lawsuits
  - Structure shut down for over six months
  - Delayed response to maintenance problems

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Responses

Physical Response – Water Level

- Insignificant water level rise except near discharge point
- Indicates little sheet flow over marsh
- Causes:
  - Lower than planned discharge
  - Canal spoil banks may restrict sheet flow to near-structure marsh
  - Proximity of outfall channels to large canals which quickly move diverted water out of project area

Physical Response – Salinity

- Salinity was reduced throughout much of the project during siphon operation
  - Greatest reduction was near the siphon discharge
  - Seasonal variation could be confounding effect
  - Pronounced effects of drought

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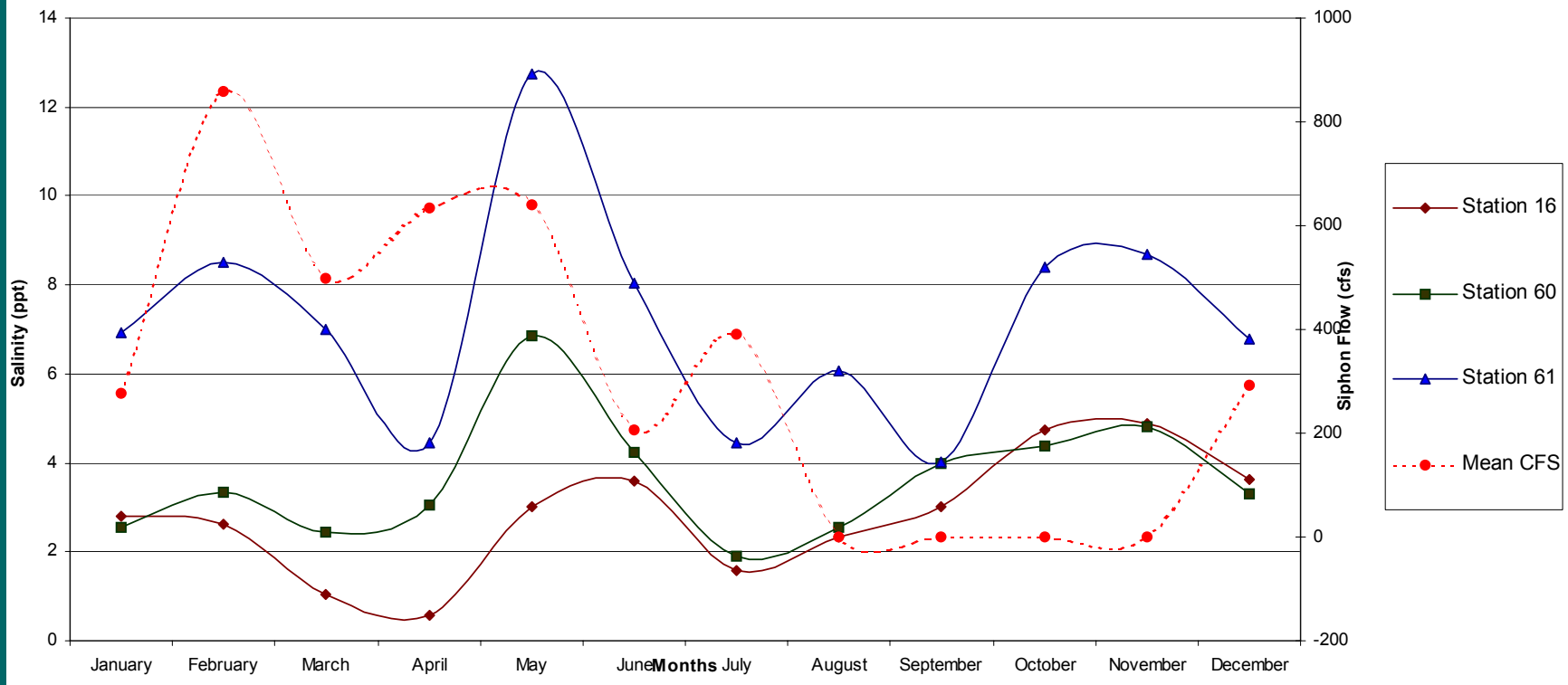
Physical Response – Salinity Data



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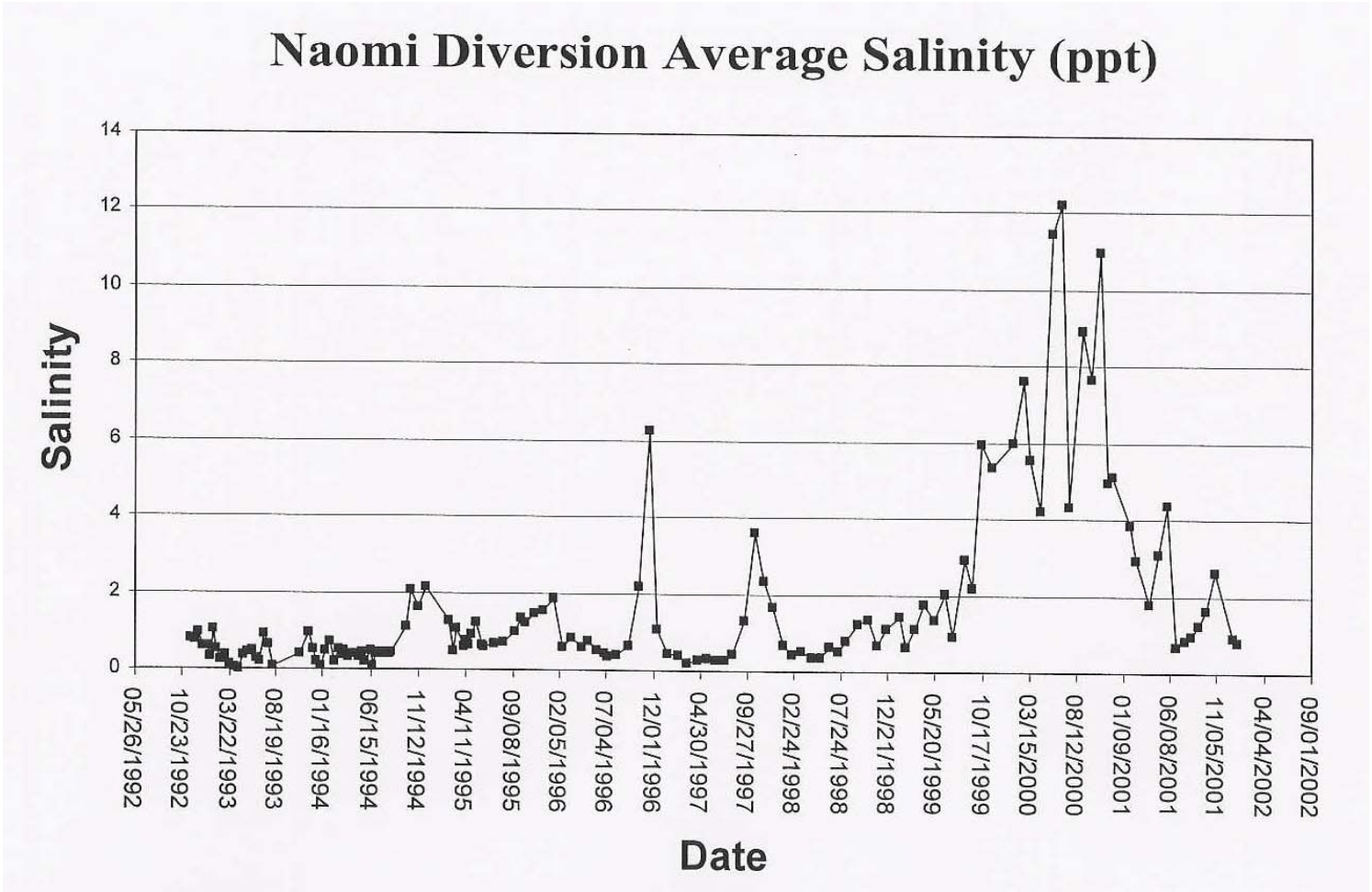
Physical Response – Spatially Averaged Salinity



Biological Response – Vegetation

- Minor changes in community vegetation type
  - Fresh/intermediate maintained near diversion
  - Elsewhere remained brackish
- Slight increase in species diversity
- Ordination analysis indicates trajectory toward brackish marsh, except near diversion
- Brackish trend likely due to
  - Erratic delivery from siphons
  - Drought

Landscape

- Pre-Construction (1993)
  - Land 13,738 ac. (56%)
  - Water 10,582 ac. (44%)
- Flight photography (2000)
  - Analyses underway

Project Effectiveness

Goal	Effectiveness
Reduce Salinity	Yes
Increase marsh/water ratio	Presently unknown
Improve conditions & presence of fresh/intermediate vegetation	Qualified Yes • Yes near structure • Away from structure diversity improved, but community structure maintained trajectory toward brackish

Project Effectiveness

- Distribution of fresh water restricted by canals & their spoil banks (sheet flow only near structure)
- Where sheet flow occurred, trajectory toward fresh/intermediate marsh observed
- Elsewhere trajectory toward brackish
- Pronounced effects of drought

Existing or Planned Improvements

- Implemented changes
  - Valve and vacuum piping maintenance (2001)
  - Outfall management project (2002)
- Planned improvements
  - Outfall management plan being developed
  - Installation of a simplified priming system
    - Install fixed vacuum pump at site
  - Installation of instrumentation
    - Flow meters and gauges (possibly online)
- Potential enrichment of water with sediments

Recommended Improvements

- Adopt quantifiable goals to identify ecosystem trajectory
  - Salinity goals based on target isohalines
  - Biological goals based on target community types
- Refine operations schedule
  - Take advantage of high spring river for increased delivery to marsh
  - Avoid prolonged inundation (mimic natural conditions)